



## Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact [support@jstor.org](mailto:support@jstor.org).

8. A woodman fells a tree 2 feet in diameter, cutting half way through from each side. The lower face of each cut is horizontal, and the upper face makes an angle of  $45^\circ$  with the horizontal. How much wood does he cut out?

[Selected from *Byerly's Integral Calculus.*]

I. Solution by CHARLES E. MYERS, Canton, Ohio.

Conceive each part removed to be generated by the motion of a right-angled triangle, moving so that its base is in a cross section of the tree and perpendicular to the axis of the tree, the sides of the triangle varying and the angles remaining constant  $=45^\circ$ . Let  $z$  = the altitude of the triangle at any time;  $V$  =  $2v$  = entire volume removed, and put  $2r = 2$  feet.

Putting the origin of co-ordinates at the circumference, we have,

$v = \int_0^{2r} \frac{1}{2} yz dx$ . From the circle,  $y = (2r-x)^{\frac{1}{2}}$ , and since the angle  $=45^\circ$ ,  $z = y$  at all times. Substituting these values of  $y$  and  $z$  in the above equation and integrating, we have,

$v = \int_0^{2r} \frac{1}{2} (2rx - x^2) dx = \frac{2}{3} r^3$ , and doubled, gives  $V = \frac{4}{3} r^3 = 1\frac{1}{3}$  cu. ft.

II. Solution by J. R. BALDWIN, A. M., Professor of Mathematics in the Davenport Business College, Davenport, Iowa.

Let  $r = 1$  foot = the radius of the tree,  $AB$  the common edge of the two cuts,  $\theta$  = the angle which the radius makes with  $AB$ ,  $\varphi = 45^\circ$ . For the element of volume, we have,  $2r \cos \theta \cdot r \sin \theta \tan \varphi \cdot d(r \sin \theta)$ .

$\therefore$  Volume  $= 4r^3 \tan \varphi \int_0^{\frac{1}{2}\pi} \cos^2 \theta \sin \theta d\theta = -4r^3 \left[ \frac{\cos^3 \theta}{3} \right]_0^{\frac{1}{2}\pi} = \frac{4}{3} r^3 = 1\frac{1}{3}$  cu. ft.

Also solved by M. C. Stevens, P. H. Philbrick, Seth Pratt, Alfred Hume, H. W. Draughon, H. C. Whitaker, G. B. M. Zerr, W. L. Harvey, and P. S. Berg.

## PROBLEMS.

16. Proposed by F. P. MATZ, M. Sc., Ph.D., Professor of Mathematics and Astronomy in New Windsor College, New Windsor, Maryland.

Differentiate  $\tan^{-1} \left( \frac{2x}{1-x^2} \right)$  with regard to  $\sin^{-1} \left( \frac{2x}{1+x^2} \right)$ .

17. Proposed by H. W. DRAUGHON, Clinton, Louisiana.

To find the volume generated by revolving a circular segment whose base is a given chord, about any diameter as an axis.